

- Fig. 40. *Lacerta ocellata* Daud. ; nat. size.
 41. *Tupinambis teguexin* Daud. ; nat. size ; from Cuvier.
 42. *Cnemidophorus tessellatus* Say ; $\times 2$.
 43. *Anniella pulchra* Gray ; $\times 4$; from specimen from James S. Lip-
 pincott.
 44. *Chirotos canaliculatus* Bonn. ; $\times 4$.
 45. *Amphisbæna alba* Linn. ; $\frac{2}{3}$ nat. size.
 46. *Rhincura floridana* Baird ; $\times 4$.

Lettering.—*Gh.*, glossohyal ; *Bh.*, basihyal ; *Ph.*, hypohyal ; *Ch.*, cera-
 tohyal ; *CB. I.*, first ceratobranchial ; *CB. II.*, second ceratobranchial ;
EB., epibranchial ; *St.*, stapes ; *E. St.*, epistapedial ; *S. St.*, suprastapedial.

ERRATA.

Page 211, line 16, for 41 read 37.

Page 211, line 27, for Plate v, Fig. 26, read Plate vi, Fig. 38

Page 216, lines 25-30. This description of the pelvis of *Anniella* is erroneous. I describe it in a paper in press in the *American Journal of Morphology*, and not having the MS. with me when the present paper was written, trusted to memory, and confused it with the pelvis of *Feylinia*.

On Some New and Little Known Paleozoic Vertebrates.

By *E. D. Cope.*

(Read before the American Philosophical Society, April 1, 1892.)

It has been long known that the Catskill-Chemung beds of Northern Pennsylvania contain a fish bed rich in specimens. This deposit has been traced from Warren, on the west, to Susquehanna county, inclusive, on the east. It is now known that at the close of the Chemung epoch, as at the close of the Devonian in Belgium and Scotland, land emergences took place, producing more or less continued brackish and fresh-water conditions. The latter received the deposits known as the Catskill in the Eastern United States, and their alternations with Chemung beds containing Chemung invertebrate fossils are now well established as facts of our geological history. A recent visit to Tioga and Bradford counties, in Pennsylvania, has recently afforded me the opportunity of inspecting some of the localities where vertebrate fossils occur. These have been already referred to by Prof. J. S. Newberry in his work on the Paleozoic fishes of North America. Guided by two geologists residing in the regions in question—Mr. Andrew Sherwin, of Mansfield, Tioga county, and Mr. A. T. Lilley, of Leroy, Bradford county—I had an excellent opportunity of observing the mode of occurrence of the fossils and of obtaining specimens. I wish here to express my particular indebtedness to these gentlemen for the aid they have rendered me.

The locality I visited, near Mansfield, is typical Catskill. The list of species obtained is not large. They are :

Bothriolepis nitidus Leidy. *Holonema rugosum* Clapp. *Ganorhynchus*

oblongus, sp. nov. *Osteolepis* or *Megalichthys*, fragments. *Holoptychius americanus* Leidy. *Holoptychius giganteus* Agass.

From Chemung beds near Leroy I obtained :

Holonema rugosum Clapp. *Holonema horridum*, sp. nov. *Holoptychius filiosus*, sp. nov.

From another locality, probably Chemung, near Leroy :

Bothriolepis minor Newb. *Coccosteus macromus*, sp. nov. *Osteolepis* or *Megalichthys*, fragments.

At the last-named locality the specimens are very abundant, but mostly dissociated, so that it is rarely that two pieces of the same fish are found in their natural relations. The bed where they occur is in some places carbonaceous from the abundant organic matter deposited there. Fragments of the Osteolepid fish above referred to are abundant, but they are too scattered for identification.

To the species found in Pennsylvania, I add the description of a fine *Megalichthys* from the Carbonic of Kansas.

OSTRACOPHORI.

HOLONEMA HORRIDUM, sp. nov.

This large species is represented by the nearly perfect mold of a plate whose position may be determined by the following considerations. It has almost exactly the form of the lateral plate of the specimen of the *Holonema rugosum* Clapp., to which I referred in describing the supposed pectoral spine of that species.* From the fact that the specimen referred to presents two median scuta, I have supposed that it is a part of the carapace. It is, however, true that the exposed surface of the long anterior median plate is acuminate in front, showing that the anterior lateral plates join anterior to it. This is not known to occur in the carapace, but is characteristic of the plastron. That this conclusion is correct is shown by the character of the median posterior scute of *H. rugosum*, shortly to be described. This being the case, it is necessary to admit that there are two median scuta, a character thus far unknown in the Antiarcha, and one which distinguishes the genus *Holonema* from *Bothriolepis*.

On this interpretation, the scute to be described is the posterior lateral of the left side of the plastron. It is about three fifths the size of that of the *Holonema rugosum* and is considerably longer than that of the *Bothriolepis nividus* Leidy. It differs from both species in its superficial sculpture. In the last-named species this is generally concentric to a non-central point. In the *Holonema rugosum* the sculpture radiates from a more or less central point. In the present species the pattern is longitudinal

* Proceedings U. S. Natl. Museum, 1891, p. 456.

cal and Literary Society, Leeds; Royal Society, Linnean Society, Meteorological Council, London; Literary and Philosophical Society, Manchester; Natural History Society of Northumberland, Durham, etc., Newcastle-on-Tyne; Royal Irish Academy, Dublin; Geological and Natural History Survey of Canada, Ottawa; Canadian Institute, Toronto; Nova-scotian Institute of Science, Halifax; Society of Natural Sciences, Portland; Agricultural Experiment Station, Amherst, Mass.; Massachusetts Historical Society, Mr. Robert T. Swan, Boston; Messrs. Hilborne T. Cresson, Andrew McFarland Davis, Cambridge, Mass.; Free Public Library, New Bedford, Mass.; Rhode Island State Agricultural Experiment Station, Providence; Connecticut Historical Society, Hartford; Yale University, American Oriental Society, New Haven, Conn.; Brooklyn Library; Prof. James Hall, Albany, N. Y.; Agricultural Experiment Station, Geneva, N. Y.; American Institute of Electrical Engineers, Academy of Sciences, Council of the Scientific Alliance of New York, American Museum Natural History, Meteorological Observatory, New York; New Jersey Agricultural Experiment Station, Geological Survey of New Jersey, Trenton; Pennsylvania Geological Survey, Harrisburg; State College, Pennsylvania; Zoölogical Society, Messrs. R. Meade Bache, Amos P. Brown, A. F. Chamberlain, John Ellis, Moses Klein, Henry Phillips, Jr., Philadelphia; Agricultural Experiment Station, College Park, Md.; Peabody Institute, Baltimore, Md.; Smithsonian Institution, Philosophical Society, Geological Survey, U. S. Naval Observatory, War Department, U. S. Board of Geographical Names, Bureau of Education, Director of the Mint, U. S. Fish Commission, Washington, D. C.; Col. C. C. Jones, Jr., Augusta, Ga.; Historical Society, Savannah, Ga.; Tulane University, New Orleans, La.; Archæological and Historical Society, Columbus, O.; Cincinnati Observatory; University of Chicago; University of Michigan, Ann Arbor; Public Library, St. Louis, Mo.; Geological Survey of Missouri, Jefferson City; Wisconsin Academy of Sciences, Agricultural Experiment Station, Madison; State University of Iowa, Iowa

City; Editor of "Kansas University Quarterly," Lawrence; Washburn College, Agricultural Experiment Station, Topeka, Kans.; Agricultural Experiment Station, Fargo, N. Dak.; Museo Michoacano, Morelia, Mexico; Bishop Crescencio Carrillo, Merida, Yucatan; Institut Egyptien, Cairo.

A paper by Prof. Daniel Kirkwood, entitled "On the Mutual Relations Between the Orbits of Certain Asteroids," was presented by the Secretary.

Pending nomination No. 1242 was read.

Deferred business was laid over.

And the Society was adjourned by the President.

Stated Meeting, September 16, 1892.

Present, 5 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

A letter from Mr. Harold Goodwin, Philadelphia, accepting membership.

New exchanges—Naturforscher Gesellschaft, Dorpat, Russia; Directeur de "La Revue des Revues," Paris; Agricultural Experiment Stations, Fargo, N. Dak., Brookings, S. Dak.

Letters of envoy were received from the Magyar Tudományos Akadémia, Budapest; Académie des Sciences, Cracow; K. Geologische Landesanstalt und Bergakademie, Berlin; Vogtländische Alterthumsforschende Verein, Hohenleuben; Ministère des Travaux Publics, Paris.

Letters of acknowledgment were received from the South African Philosophical Society, Cape Town (134, 135); Capt. Richard C. Temple, Bombay, India (136); Société de Géographie de Finlande, Helsingfors (96-130, 136, 137, and Catalogue, Parts i-iv); Observatoire Physique Central, St. Petersburg (137); Prof. Japetus Steenstrup, Copenhagen (136, 137);

Naturforschende Verein, Brünn, Austria (134, 135); Dr. Francis Pulzsky, Budapest (135); Naturhistorische Landes-Museum von Kärnten, Klagenfurt (136); Astronomische und Meteorologische Observatorium, Triest, Austria (125-130, 136); Section für Naturkunde des Ö. T. C. bei K. K. Naturhistorische Hofmuseum (136), Anthropologische Gesellschaft (136), Dr. Edward Suess (137, 138), Dr. Friedrich S. Krauss (Diploma), Vienna; Gesellschaft für Erdkunde, K. Geologische Landesanstalt und Bergakademie, Prof. F. Reuleaux, Berlin (137); Naturhistorischer Verein, Bonn (136); Schlesische Gesellschaft für Vaterländische Cultur, Breslau (136); Verein für Erdkunde, Dresden (138); Deutsche Seewarte, Hamburg (137); Naturhistorische Gesellschaft, Hanover (137); Vogtländische Alterthumsforschende Verein, Hohenleuben (137); Gesellschaft zur Beförderung der Gesammten Naturwissenschaften, Marburg (134); Verein für Erdkunde, Metz (137); K. P. Geodätische Institut, Potsdam (137); Verein für Vaterländische Naturkunde in Württemberg, Stuttgart (135); Schweiz. Naturforschende Gesellschaft, Bern (137, 138); Prof. Carl Vogt, Geneva (137, 138); Sociéte Vaudoise des Sciences Naturelles, Lausanne (137, 138); R. Accademia de Scienze, Lettere, etc., Padova (136); Marquis Antonio de Gregorio, Palermo (136); R. Osservatorio, Torino (136); Ministère des Travaux Publics, M. Victor Duruy, Profs. Emil Levasseur, E. Mascart, Paris (137); Mr. Samuel Timmius, Arley, Coventry, Eng. (Diploma and 138); Philosophical Society, Cambridge, Eng. (Trans., xvii, 1, 2, and 138); Royal Society (Trans., xvii, 1, 2, and 138); R. Meteorological Society, Royal Institution of G. B., R. Geographical Society, Victoria Institute, Mr. C. Juhlin Dannfeldt, Prof. William Crookes, Sirs Joseph D. Hooker, James Paget, Henry Thompson, London (138); Manchester Geographical Society (138); Natural History Society of Northumberland, Durham and New Castle-on-Tyne (138); Royal Society of Edinburgh (Trans., xvii, 1, 2, and 138); Royal Observatory, Edinburgh (138); Philosophical Society, Glasgow (138); R. I. State Agricultural Experiment Station, Kingston (137, 138); Prof. J. J. Stevenson, New York (138); Prof. W. Le Conte

Stevens, Troy, N. Y. (138); Prof. E. D. Cope, Mr. H. H. Houston, Philadelphia (138); U. S. Geological Survey, Washington, D. C. (Trans., xvii, 1, 2, and 138); Leander McCormick Observatory, University of Virginia (138); "Journal of Comparative Neurology," Granville, O. (138); Dr. Robert Peter, Lexington, Ky. (138); Kansas Academy of Science (138), Washburn College (137), Topeka; Prof. Daniel Kirkwood, Riverside, Cal. (138); Bishop Crescencio Carrillo, Merida, Yucatan (138).

Accessions to the Library were announced from the Comité de Conservation des Monuments de l'Art Arabe, Cairo; New Zealand Institute, Wellington; K. K. Mineralogische Gesellschaft, St. Petersburg; K. Zoologisch. Botanische Genootschap, 's Gravenhage; Genootschap van Kunsten en Wetenschappen, Batavia; Académie des Sciences, Cracow; K. K. Militär Geographische Institut, K. K. Geologische Reichsanstalt, Vienna; K. Akademie der Wissenschaften, Physiologische Gesellschaft, Berlin; Naturhistorischer Verein, Bonn; Verein für die Geschichte und Altertumskunde, Erfurt; Oberlausitzer Gesellschaft der Wissenschaften, Görlitz; Vogtländische Alterthumsforschende Verein, Hohenleuben; Verein für Vaterländische Naturkunde, Stuttgart; Mr. T. Cannizzaro, Messina, Italy; Ministère des Travaux Publics, Paris; Royal Society, London; University of Toronto; American Academy of Arts and Sciences, Mr. Samuel A. Green, Boston, Mass.; New York Agricultural Experiment Station, Geneva; Cornell University, Ithaca; Mr. William John Potts, Camden; New Jersey Historical Society, Newark; American Academy of Political and Social Science, Rev. S. F. Hotchkiss, J. F. Sachse, Miss Rebecca Elmslie, Philadelphia; Weather Bureau, Hydrographic Office, U. S. Naval Observatory, Washington, D. C.; University of California, Berkeley.

The following decease of members was announced :

John G. Whittier, born December 7, 1802; died September 7, 1892.

Prof. Joseph Lovering, Cambridge, Mass., born December 25, 1813; died January 18, 1892.

Pending nomination 1242 and new nominations 1243 and 1244 were read.

On motion, the Society

Resolved, That Dr. Charles E. Sajous be appointed a delegate to represent this Society at the Congrès des Américanistes, to be held at Huelva in October, 1892, provided that the same shall entail no expense upon this Society.

And the Society was adjourned by the President.

Stated Meeting, October 7, 1892.

Present, 16 members.

President, Mr. FRALEY, in the Chair.

Correspondence was submitted as follows:

A circular letter from Prof. Edward C. Pickering, Cambridge, Mass., in regard to a large southern telescope, and soliciting funds for same.

Accessions to the Library were reported from the Government Geologist, Adelaide, Australia; Académie Royale des Sciences, Amsterdam; "Flora Batava," Leiden; Mr. G. Bauer, Agram, Hungary; K. K. Naturhistorische Hofmuseum, Vienna; Mr. Albin Weisbach, Freiberg, Baden; Verein für Naturkunde, Offenbach a. M.; Société Languedocienne de Géographie, Montpellier; University Library, Cambridge, England; Radcliffe Observatory, Oxford; Natural History and Antiquarian Society, Penzance; Royal Dublin Society; Department of Agriculture, Ottawa, Canada; Agricultural Experiment Station, Bangor, Me.; Pope Manufacturing Co., Boston; Harvard University, Cambridge; Mr. Andrew McFarland Davis, Salem; American Antiquarian Society, Worcester; Dr. George Eastburn, American Meteorological Society,

Public Opinion Co., New York; Numismatic and Antiquarian Society, Mr. Henry Phillips, Jr., Philadelphia.

Letters of envoy were received from the Académie des Sciences, Amsterdam; Radcliffe Observatory, Oxford, England; Zoölogical Society, London; Royal Dublin Society; Geological and Natural History Survey, Department of Agriculture, Ottawa, Canada.

Letters of acknowledgment were received from the Royal Society of Victoria, Melbourne (136); Naturforsch. Gesellschaft, Dorpat, Russia (134); K. Danske Videnskabernes Selskab, Copenhagen (136); Académie Royale des Sciences, Amsterdam (135, 136); Académie des Sciences, Cracow, Austria (136); Prof. Peter Tunner, Leoben (137); K. K. Central Anstalt für Meteorologie (138); Dr. Aristides Brezina, Vienna (137); Naturforschende Gesellschaft des Osterlandes, Altenburg (138); K. Meteorologische Institut (137), K. Geologische Landesanstalt u. Bergakademie (138), Berlin; Oberhessische Gesellschaft für Naturkunde und Heilhunde, Giessen (137); Geographische Gesellschaft, Hannover (136); K. Sächsische Gesellschaft der Wissenschaften (136), K. Sternwarte, Profs. Otto Böttlingk, I. Victor Carus (137, 138), Leipzig; Verein für Erdkunde, Metz (136); Verein der Freunde der Naturgeschichte, Mecklenburg (137); Naturwissenschaftliche Verein, Osnabrück (137); R. Biblioteca N. C., Firenze, Italy (136); R. Società Italiana D'Igiene, Milan (136); R. Biblioteca Universitaria, Pisa (136); R. Comitato Geologico D'Italia, Rome (137); Société de Géographie, Rédaction "Cosmos," Dr. E. Hamy, Profs. Abel Hovelacque, E. Levasseur, Paris (138); University Library, Cambridge, England (138); Linnean Society, London (138); Prof. W. Boyd Dawkins, Manchester, England (137, 138); Radcliffe Observatory, Oxford (134, 135, 136, 138, and Trans., xvii, 1 and 2); Tacoma Academy of Science (138); Prof. Joseph LeConte, Berkeley, Cal. (138); Prof. Robert W. Rogers, Carlisle, Pa. (138).

The Wyoming Historical and Geological Society presented a copy of "The Wyoming Memorial Medal" in white metal.

The deaths of Joseph Ernest Renan (Paris), October 2,

1892, æt. 70, and Thomas Chase (Providence, R. I.), October 6, 1892, æt. 66, were announced.

Prof. Daniel G. Brinton presented a paper entitled "Further Notes on the Betoaya Dialect from Unpublished Sources."

Prof. E. D. Cope presented a paper on "The Phylogeny of the Vertebrata."

Also a paper on "Some Points in the Kinetogenesis of the Limbs of Vertebrata."

Pending nominations Nos. 1242, 1243 and 1244 were read.

The following report was presented from the Michaux Committee, and the resolution appended was, on motion, adopted :

TO THE AMERICAN PHILOSOPHICAL SOCIETY :

The Michaux Committee respectfully reports, that at a meeting of the Committee, held on September 16, 1892, a letter was received from Dr. J. T. Rothrock, enclosing the following list of the time and subjects proposed for the Fourteenth Course of lectures given under the auspices of the American Philosophical Society :

WEDNESDAY EVENINGS.

- Nov. 9. Trees of Pennsylvania (illustrated).
- " 16. History and Fertility of Soil (illustrated).
- " 23. What is Economic Botany?
- " 30. Plant Form Applied to Decorative Art (illustrated).
- Dec. 7. Plant Structure Applied to Mechanical Art (illustrated).
- " 14. How to Plant and Grow Trees.
- " 21. How to Care for Trees.

It is expected that the lectures will be delivered in the Hall of the Academy of Natural Sciences, which has been kindly tendered to him by the Academy for that purpose.

The Committee approved of the proposition and requests the Society to make an appropriation of \$244 out of the income of the Michaux Fund to meet the expenses of the lectures.

The Committee submits the following resolution, which it desires shall be passed by the Society :

"Resolved, That the sum of two hundred and forty-four dollars be appropriated out of the income of the Michaux Fund towards the expenses of the Fourteenth Course of the Michaux Forestry Lectures by Dr. J. T. Rothrock."

By order of the Committee,

J. SERGEANT PRICE, *Secretary.*